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MPA Management Capacity Building Training

Module 7:

FISHERIES MANAGEMENT ISSUES IN SE ASIA

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Overview of Presentation

1. Fundamentals of Fisheries Management

- Goals of fisheries management
- Review of basic fisheries concepts
- Fishing methods & gears of southeast Asia

2. Management Strategies for SE Asia

3. Aquaculture in SE Asia

4. FIELD TRIP: Aquaculture

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What Are Today's Objectives?

- Review and expand our knowledge of basic fisheries concepts
- Discuss fishing methods and fishing practices commonly used in SE Asia
- Discuss fishing management approaches useful with SE Asian fishing methods & habitats
- Learn about common aquaculture practices and visit a working aquaculture site

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Review & Discuss What We Know

- **Discuss** the implementation plan developed during the Management Planning modules
- **Review & discuss** what you already know about fisheries & aquaculture in your area:
  - What fishing methods are used in your area?
  - What stocks are most overfished?
  - What information do you wish you had?

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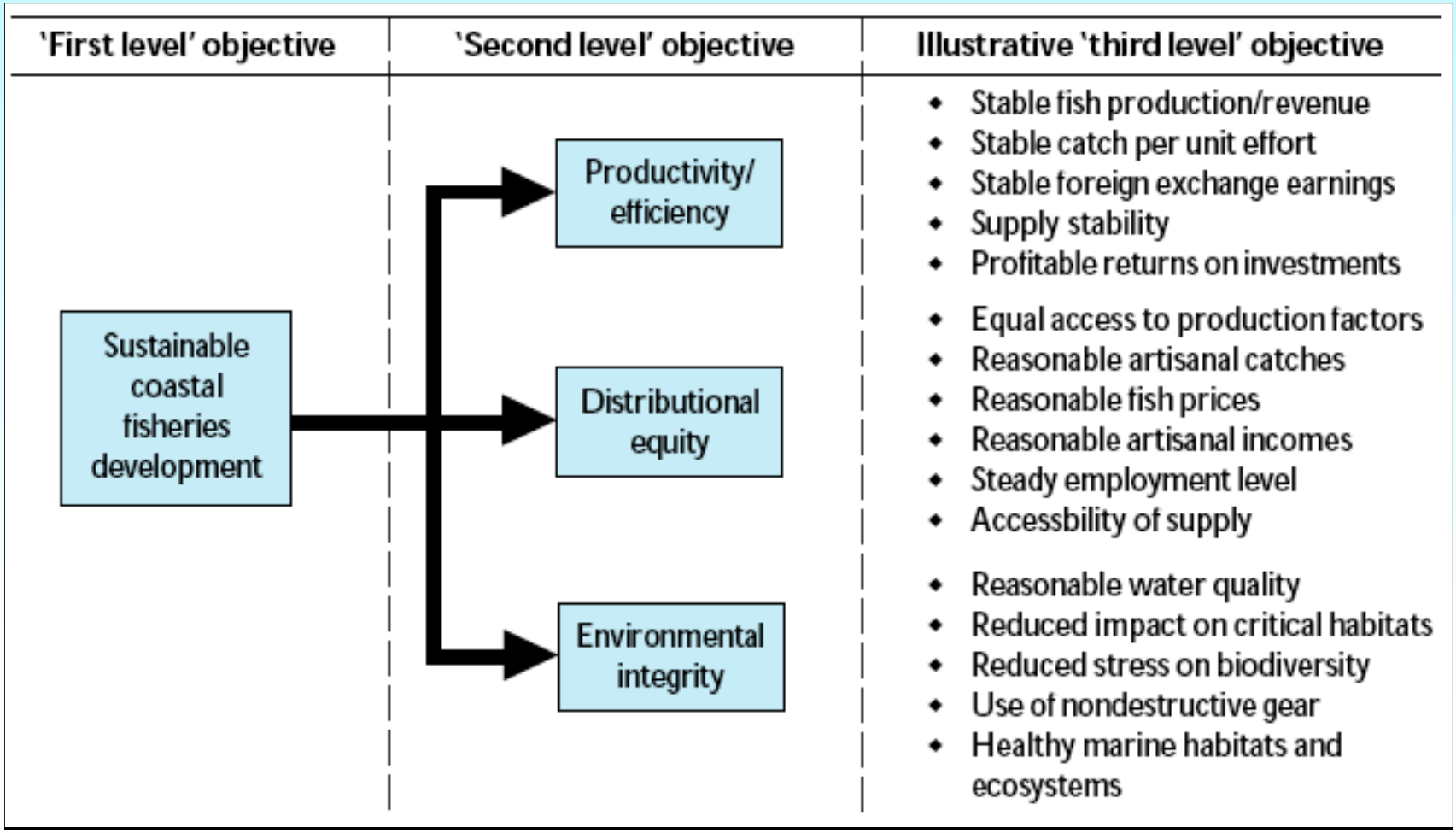
1. Fundamentals of Fisheries Management

Three goals of fisheries management: fish, income, environment.



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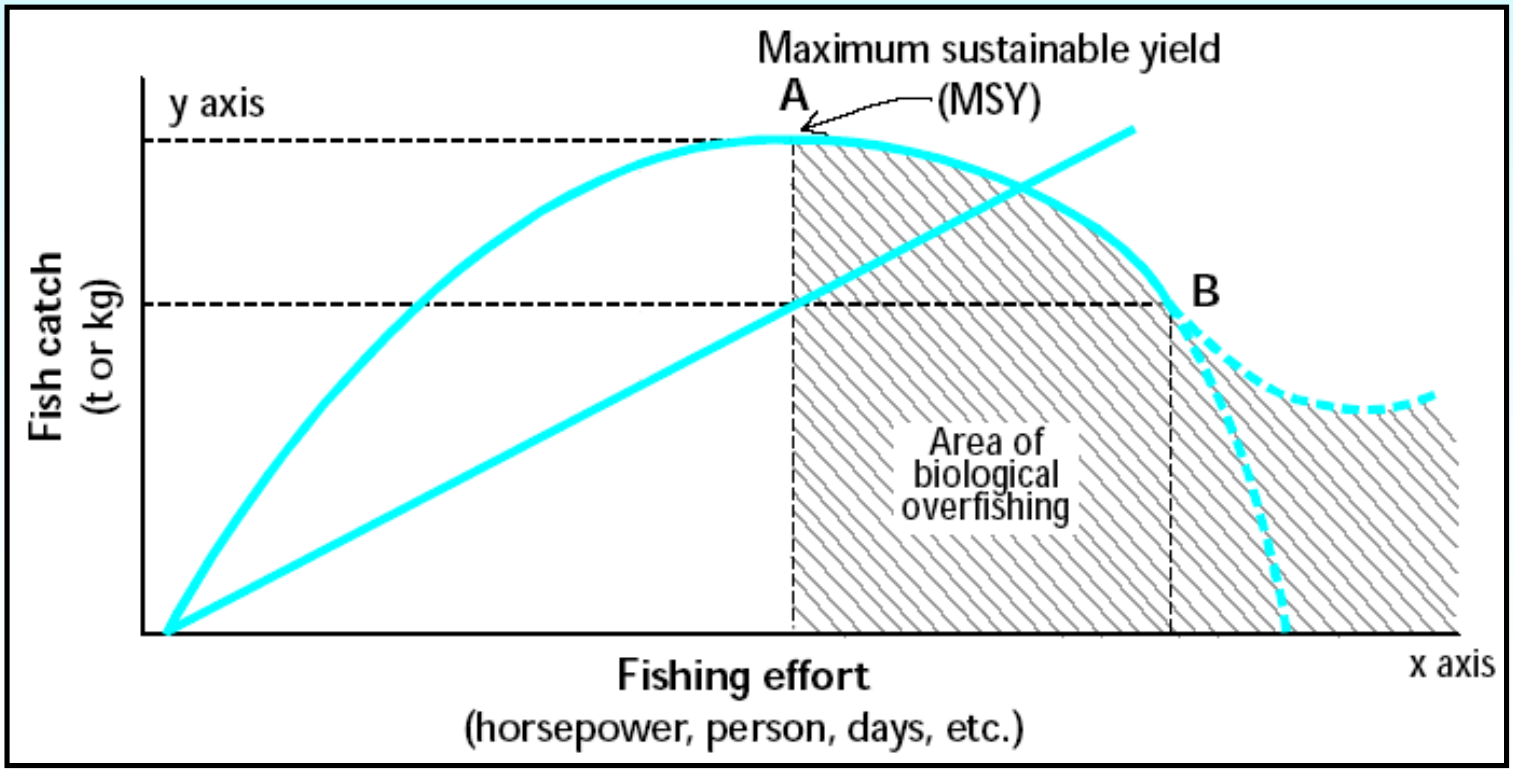
Do More Boats Catch More Fish?

Mortality** must be balanced by **reproduction & recruitment.

How much **fishing-caused mortality** can a fish stock tolerate?



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Overfishing

- **Biological overfishing**
  - Growth overfishing
  - Recruitment overfishing
  - Environmental overfishing
- **Economic overfishing**

With a large population of fishers, overfishing will almost always happen. Why?

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Tragedy of the Commons

Private Resource	Common Resource
Resource is protected; is not available to everybody *Short-term greed is penalized* *Long-term planning is rewarded*	Resource is not protected; available to everybody *Short-term greed is rewarded* *Long-term planning is penalized*

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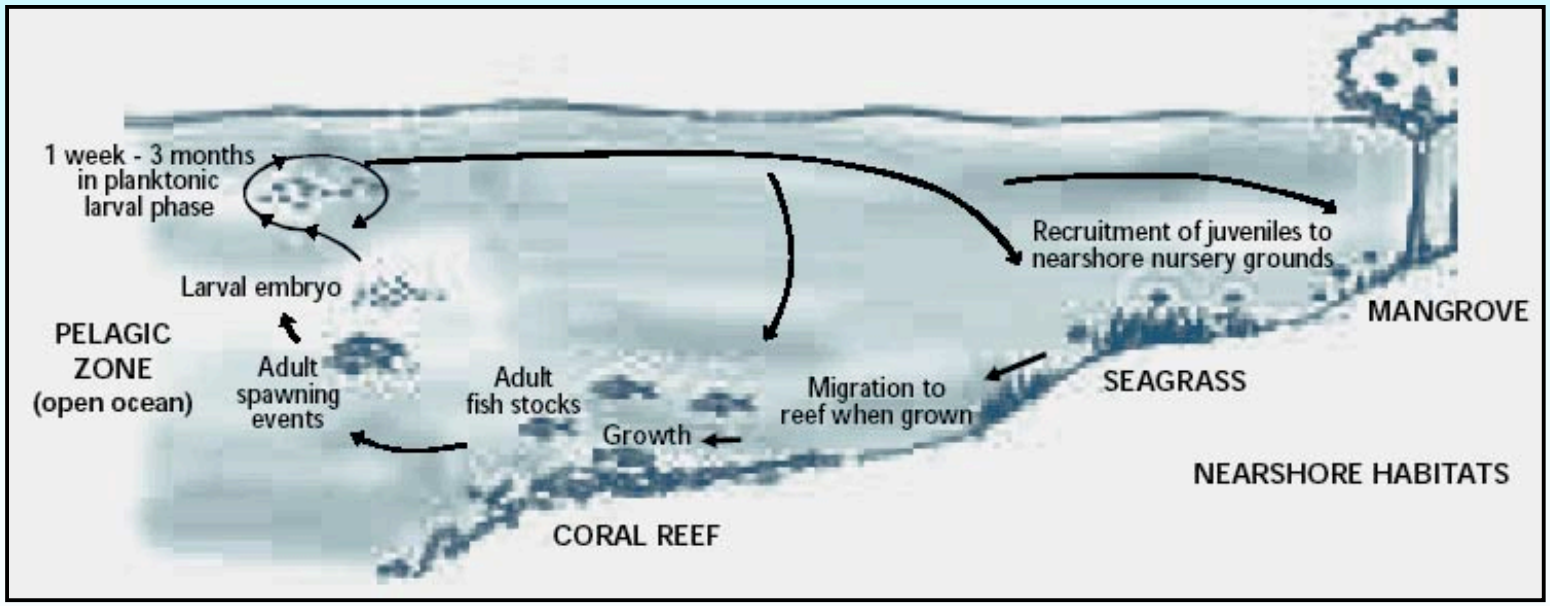
Ecology Basics 1

One species may need different habitats:



Changes in one habitat can affect fisheries in different habitats.

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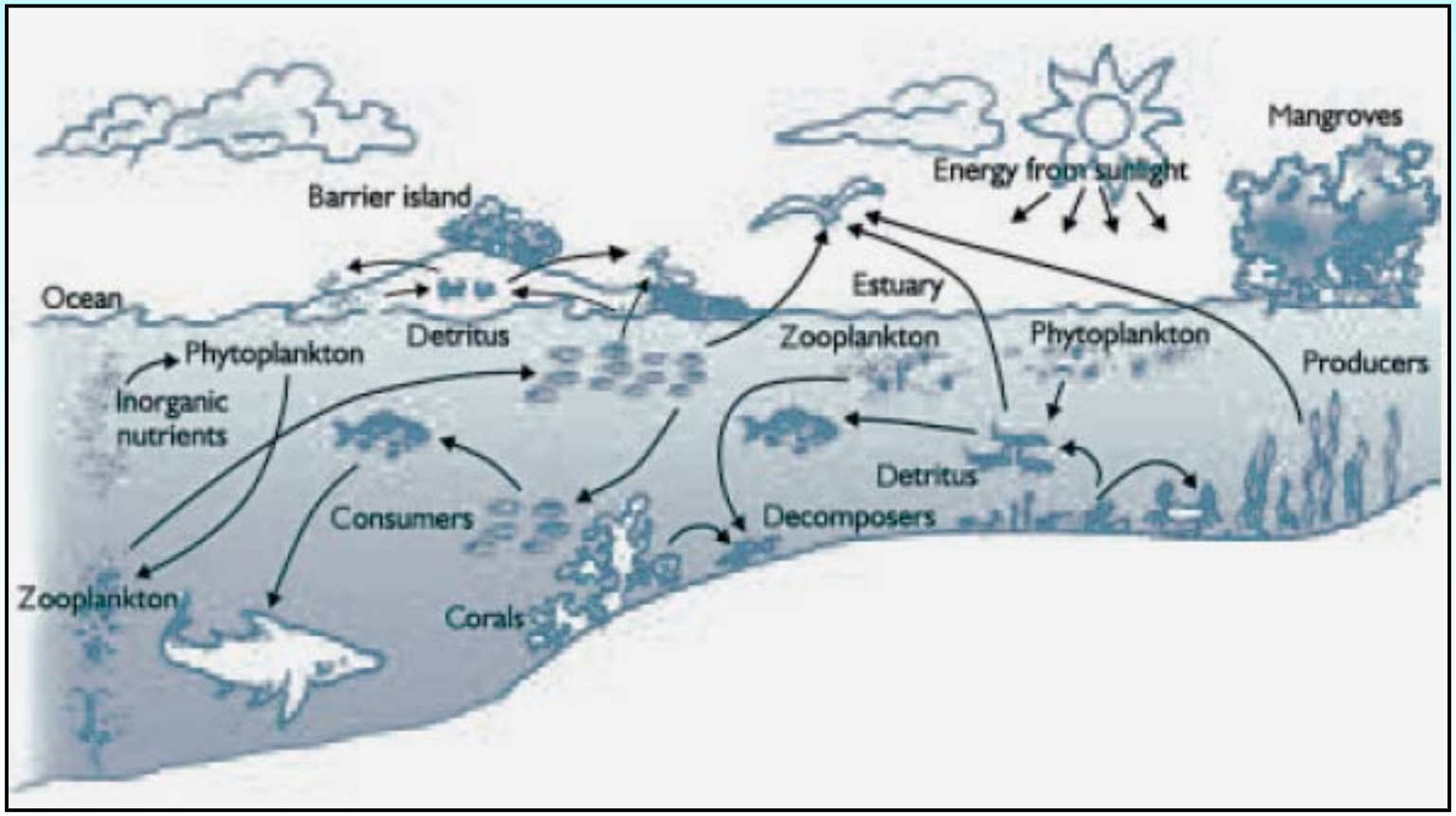
Ecology Basics 2

Different species all affect each other:



Fishing one species can affect many other species.

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Fishing Methods & Gears

- **Hook-and-line**
- **Traps**
- **Spear fishing**
- **Collecting at low tide**

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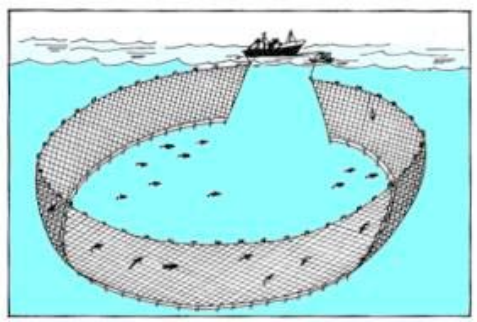
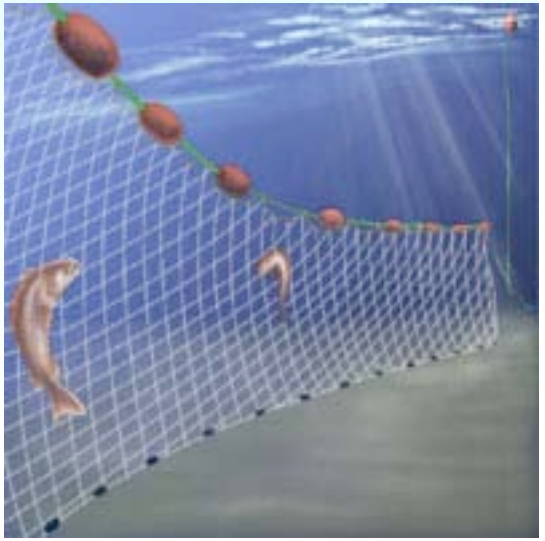
Fishing Methods & Gears



- **Nets**
  - many different types
  - mesh size very important
  - stationary vs. moved
  - trawl, purse seine, beach seine, gill net,



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Fishing Methods & Gears

- **Stunning/blasting methods**

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Some Destructive Methods

Blast fishing	Causes *immediate reef destruction*. Destroys the backbones of fish. Kills all living things in the vicinity, including young fish, many other fish species, invertebrates and coral. Reduces tourism. Requires many decades for recovery.
Cyanide fishing (stunning of fish for live-fish colleciton, for food fish or aquarium trade)	Used to stun coral reef fish for live-fish collection, for the food fish or for the aquarium fish trade. Unfortunately, also kills coral polyps (the organisms that build coral reefs) and invertebrates. Hazardous to health of divers. Reduces tourism.
Electrofishing	Indiscriminately kills young fish and non-targeted species.
Fine-mesh nets	Indiscriminate captures small fish; therefore, captures many young fish and many non-targeted species.
Trawl	Scrapes sea bed and destroys sea-floor habitat; indiscriminate catching of non-targeted species
Purse seine	Indiscriminate catching of non-targeted species
Drive-in methods (herding fish toward nets)	Pounding destroys corals and reef. Catches many non-targeted species. Overfishes coral reefs. Unsafe for divers.
Spear fishing (with compressor or SCUBA)	Catches rare remaining large fish on reefs and depletes certain species. Creates a reef community consisting of small, undesirable fish. Unsafe for divers.

Blast fishing

Dead fish:

Rubble field:

Trawling

Trawling scar:

Seafloor before trawling:

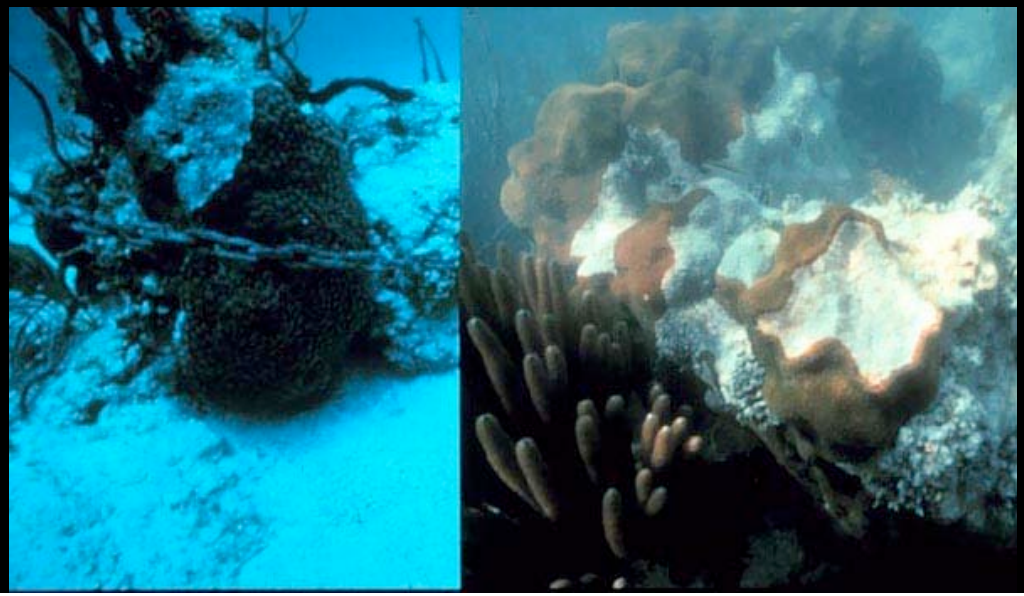
Seafloor after trawling:

Example: Coral Reefs & various fishing methods

Rubble field after blast fishing:

Cyanide fishing:

Anchor & boat scars:



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MPAs & Fishing Methods

Discussion:

What fishing methods should be prohibited or regulated with MPAs of different habitats?

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2. Fisheries Management Strategies for SE Asia

Practical strategies & tools:

- Closed areas (can be MPAs)
- Closed seasons
- Licensing, permitting & taxes
- Allowable catch levels, quotas & limits
- Restricting fishing methods & gear

What are some problems with each of these methods? Which are hardest to implement? Which are easiest?

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Management Considerations for Different Habitats

Estuaries & lagoons

- Nearby land use
- Salinity
- Nearby aquaculture
- Fishing gear & effort
- EIA's for construction & development

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Management Considerations for Different Habitats

Mangrove forests

- (*as for estuaries/lagoons*:) Nearby land use, salinity, nearby aquaculture, fishing gear & effort, EIA's for construction & development
- Minimize cutting or destruction of mangroves
- Replant when possible

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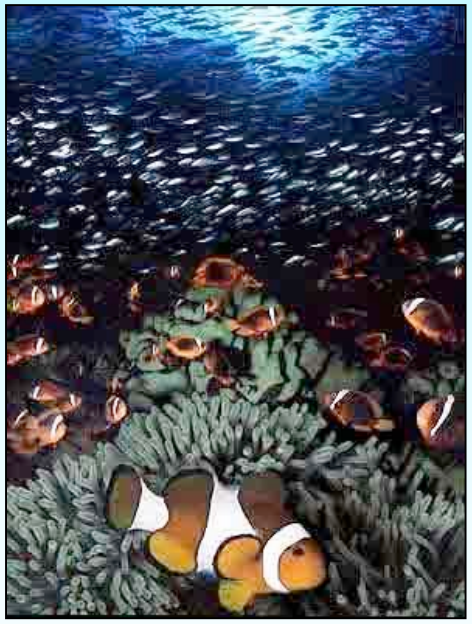
Management Considerations for Different Habitats

Coral reefs



- Physical destruction ***must*** be minimized
- Protection of small/young fish
- Monitor effects of tourism

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Review: Zonal Management

Suggested coastal use zones (from PHIL 6, 2001)

- Protected area zone
  - Fish sanctuaries (no -take areas)
  - Mangrove reservers
  - Other human activities or access to the area may be restricted
- Rehabilitation zone
  - Areas with damaged habitats
  - Some fishing is all owed, but limited
  - Other human activities or access to the area may be allowed, but limited
- Sustainable -use zone
  - Fishing is allowed, but types of gear and kinds of fishing are regulated.
- Coastal tourism zone
- Trade and navigation zone
- Residental zone
- Commercial zone
- Forest zone

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Assessment

How can we know when a new strategy is needed?

How can we know if an existing one is working?

We need a way of assessing:

- which habitats need further protection
- which fishing methods & gear need regulation
- which species are being overfished

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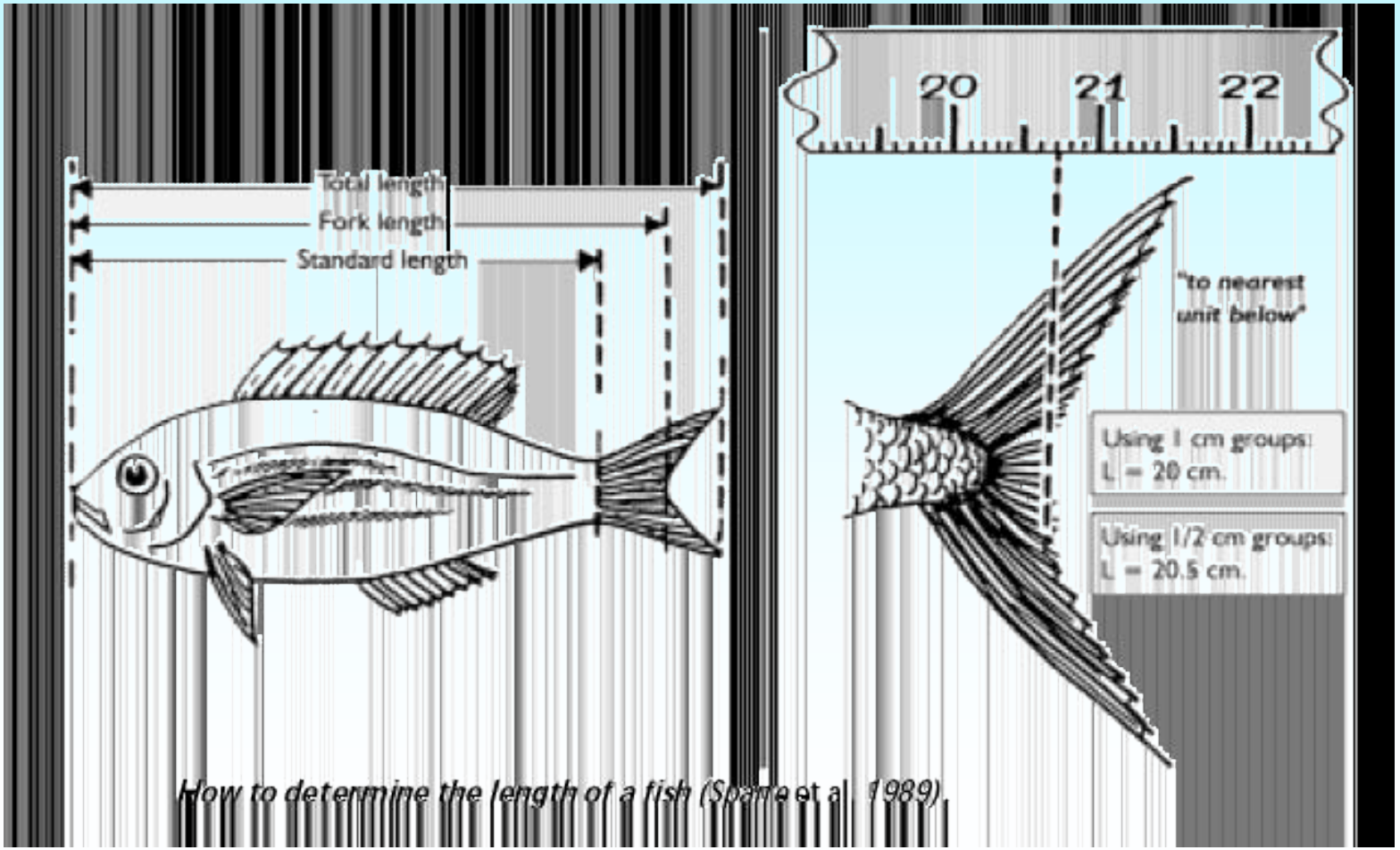
Assessment: Measuring Fish



How to determine the length of a fish (Sparre et al. 1989)

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Assessment: Signs of Overfishing

Discussion:

- What are the signs of an overfished area?
- What information is necessary to detect these signs?
- Do you have access to this information?

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Some Signs of Overfishing

- Change in species being caught with same method
- Fish are smaller
- Decline in total fish catch
- More fishing effort required for same catch size
- Decline in income of fishers
- Boats not going out to fish (because is not worthwhile)
- Fewer seabirds

Can you think of other signs?

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3. Aquaculture in SE Asia

- Common **mariculture** (marine aquaculture):
  - seaweeds
  - sponges
  - crustaceans: shrimp, crabs, lobsters
  - bivalves: oysters, cockles, mussels
  - fishes: tilapia, milkfish, mullet, others
- The most common aquaculture facilities now are **shrimp farms** and **tilapia farms.**

Farmed *Tilapia*

Farmed prawns

Shrimp farm:

Aquaculture in the Tam Giang lagoon

Mollusc farm:

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Aquaculture Problems

- Destruction & conversion of surrounding habitat
- Pollution
  - excess food
  - waste products (feces, etc.)
  - antibiotics, pesticides, fertilizers
  - sedimentation
- Introduction of exotic species & diseases

Clearing of native mangrove forests for shrimp farms:

1989

2001

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Summary of Today's Session

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